

60,246-300; 10,831

**UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Shah  
Serial No.: 10/752,626  
Filed: 1/7/2004  
Art Unit: 3744  
Examiner: Tanner, Harry B.  
Title: Serial Communicating HVAC System

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P.O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Dear Sir:

Applicant now submits its brief subsequent to the filing of a Notice of Appeal on 20 March 2006. Fees in the amount of \$500.00 may be charged to Deposit Account No. 03-0835 in the name of Carrier Corporation.

**Real Party in Interest**

The real party in interest in this application is Carrier Corporation.

**Related Appeals and Interferences**

There are no prior or pending appeals, interferences or judicial proceedings relating to this appeal, or which may directly effect or be directly effected by, or have a bearing on, the Board's decision in this appeal.

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**Status of Claims**

Claims 1-29 stand finally rejected, and appealed.

**Status of Amendments**

No amendments after final rejection have been filed.

**Summary of the Claimed Subject Matter**

The present invention improves upon controls for heating, ventilating and air conditioning (HVAC) systems. In the prior art, a thermostat has typically been provided with a hard-wire control to connect to any one of several associated systems. As an example, most HVAC systems have an indoor unit, such as a furnace or fan/heater combination, and an outdoor unit such as an air conditioner or heat pump. In addition, other peripheral components such as humidifiers, flow dampers, etc., are controlled from the thermostat. As HVAC systems become increasingly sophisticated, the number of components to be connected and controlled from the thermostat will likely increase. However, many existing systems only have four wires going from the thermostat to the several components. In addition, thermostats are known that have many more wires to communicate with the several components. Of course, this becomes unduly burdensome and requires a good deal of space.

**Independent Claim 1 and its Dependents.**

Claim 1 recites a system (20) wherein a thermostat (22) is provided with a controller (26) which communicates over a data bus with an indoor HVAC system unit capable of providing heat (30) (typically, either a furnace or a fan and heater combination). User input switches (24) are associated with the thermostat. A control (32) is part of the indoor HVAC system unit. (See Figure 1; paragraphs 15 and 16.)

Claim 2 is dependent to claim 1 and adds the limitation that there is an outdoor HVAC unit (36) provided with its own control (38) and that this outdoor HVAC unit control communicates with the central control over the data bus.

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Dependent claim 3 is dependent to claim 1 and adds in that at least one peripheral HVAC unit includes its own control and communicates through the indoor HVAC unit control to provide control signals to and from the central control.

Dependent claim 4 is dependent to claim 1 and recites that the data bus includes four wires with two of the wires carrying power and two of the wires carrying control signals with a plurality of distinct signals being sent over the two wires carrying the control signals.

Dependent claim 5 is dependent to claim 1 wherein at least one peripheral unit is hardwired to the indoor HVAC unit control (44) and that the indoor HVAC (56, 58) unit control is designed to include control information for the at least one peripheral unit.

Claim 6, dependent to claim 1, requires an interface module (54) that is provided with a control to communicate with the data bus from an associated HVAC unit that does not have a control capable of receiving control signals over the data bus. (See Figure 2; paragraph 32.) The interface module is hard-wired to the associated HVAC unit, and the interface module is provided with control information for in turn controlling the associated HVAC unit.

Claim 23 is dependent to claim 1 and recites that the indoor HVAC unit is either a furnace or a fan/heater unit.

Claim 24 is dependent to claim 2 and recites that the outdoor HVAC unit is one of an air conditioner and a heat pump.

*Independent Claim 10 and its Dependents.*

Independent claim 10 requires there be a data bus with four wires (A, B, C, D) carrying signals from the central control (22/26) to a control (32) for an indoor HVAC unit (30). The data bus wires include two control wires and two power wires. The indoor HVAC unit is operable to provide heating and a fan function to move air within an environment. Claim 10 further requires that there be an outdoor HVAC unit (36) provided with four wires, with two power wires and two control wires.

Dependent claim 11 is dependent to claim 10 and requires that there be at least one hard-wired peripheral unit, with the indoor HVAC unit control design to include control information for this at least one peripheral unit. This claim is similar to claim 5.

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Claim 12 is dependent to claim 11 and requires that this one peripheral unit is a humidifier.

Claim 13 is dependent to claim 10 and requires that there be at least one peripheral control unit including its own control. This at least one peripheral unit control communicates with the central control over four wires, with there being two power wires and two control wires.

Dependent claim 14 is dependent to claim 13 and recites that this at least one peripheral unit is a damper control module (40).

Dependent claim 15 is dependent to claim 13 and recites that the at least one peripheral unit is a sensor providing signals to the central control over the two control wires.

Dependent claim 16 is dependent to claim 10 and recites that the outdoor HVAC unit control communicates with the central control serially through the indoor HVAC unit control. This is shown in Figure 2.

Dependent claim 17 recites that the indoor and outdoor HVAC units independently connect into the data bus.

Dependent claim 18 recites the interface module, and is thus similar to the features added by claim 6.

Claim 25 is dependent to claim 10 and recites that the indoor HVAC unit is either a furnace or a fan/heater unit.

Claim 26 is dependent to claim 10 and recites that the outdoor HVAC unit is one of an air conditioner and a heat pump.

Independent Claim 22 and its Dependents.

Independent claim 22 recites a central control, a thermostat, an indoor HVAC unit operable to provide a heating function to air within an environment, and the indoor HVAC unit provided with a control to control the HVAC unit. The claim further recites that a data bus communicates control signals from the central control to and from a thermostat and to at least the indoor HVAC unit. The control in the indoor HVAC unit receives signals from a central control over the data bus, and in turn controls the indoor HVAC unit.

Claim 27 is dependent to claim 22 and recites that the indoor HVAC unit is one of a furnace and a fan heater unit.

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Dependent claim 28 is dependent to claim 22 and recites that the outdoor HVAC unit is provided with its own control, and this outdoor HVAC unit control communicates with the central control over the data bus.

Dependent claim 29 is dependent to claim 28 and recites that the outdoor HVAC unit is one of an air conditioner and a heat pump.

**Grounds of Rejection to be Reviewed on Appeal**

- A. The 35 USC §102(b) Rejection of Claims 1-2, 5, 8, 9 and 22 Over the Prior Patent to Kobayashi, et al. is Appealed.
- B. The 35 USC §103 Rejection of Claims 4, 10-11, 16-17, and 19-21 Over Kobayashi, et al. is Appealed.
- C. The Rejection under 35 U.S.C. §103 of Claims 3 and 12-14 Over Kobayashi, et al. Taken With Otsuka, et al. is Appealed.
- D. The Rejection of Claims 23-29 under 35 USC §103 as Being Unpatentable Over Kobayashi, et al. Taken With "Official Notice" is Contested.
- E. The Rejection Under 35 USC §103 of Claims 6 and 18 as Being Unpatentable Over Kobayashi, et al., and Further in View of Munson, et al. is Contested.
- F. The Rejection Under 35 USC §103 of Claims 7 and 15 as Being Unpatentable Over Kobayashi, et al., and Further in View of Jurewicz, et al. is Appealed.

**Arguments**

***The Rejection Under 35 USC §102 Over Kobayashi, et al. is Improper.***

The examiner rejects claims 1, 2, 5, 8, 9 and 22 as being anticipated by Kobayashi, et al. The examiner points to room thermostats 14 in Kobayashi, et al. which communicate to a damper control 9A to control the amount of air flowing into an environment. Presumably, other control wires would have to connect to the HVAC system elements such as the blower 5, or the indoor heat exchanger 4, or the other components of the air conditioner 17. Thus, Kobayashi, et al. is truly nothing more than the prior art. Kobayashi, et al. does not include an indoor HVAC unit provided with a control, wherein the HVAC unit is operable to provide "a heating function"

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to air moving into the environment. The dampers of Kobayashi, et al. control how much heated or cooled air may flow into the environment, but they are not providing a heating function to that air.

*The Rejection of Claim 2 is Separately Improper.*

Claim 2 requires that there be an outdoor HVAC unit provided with its own control and also communicating with the central control over the same data bus as required by claim 1. Nothing within Kobayashi, et al. can meet the limitations of claim 2. The examiner's rejection does not even identify any structure within Kobayashi, et al. which would meet this limitation. Again, it appears that separate wires are utilized in this device.

*The Rejection of Claim 5 is Separately Improper.*

Claim 5 requires that at least one peripheral unit is hardwired to the indoor HVAC unit control, and the indoor HVAC unit control being designed to include control information for the at least one peripheral unit. Again, the examiner's argument that the damper of Kobayashi, et al. can provide the "indoor unit," would provide nothing to meet this "peripheral unit" limitation. As such, Kobayashi, et al. cannot properly reject this claim.

*The Rejection of Claim 22 is Separately Improper.*

Claim 22 requires there be an indoor unit, and the indoor unit including a control which communicates with a control having operator input switches. A data bus communicates control signals from the central control to and from the thermostat and to at least the indoor HVAC unit. The data bus provides control signals from the operator input switches.

Again, the claim requires that the indoor HVAC unit is operable to provide a heating function. The damper module of Kobayashi, et al. cannot meet this limitation. As such, this claim is separately allowable.

*The Rejection of Claims 23, 25 and 27 over Kobayashi, et al. and "Official Notice" is Improper.*

These claims further define what is meant by the "indoor HVAC unit." They make clear that the indoor HVAC unit which has its own control is either a furnace or a fan/heater combination. It is certainly not Appellant's claim that it has invented either a furnace or a

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fan/heater combination. Rather, the invention is to incorporate a control on such a unit and communicate with the central control over the data bus.

The examiner has only Kobayashi, et al. which shows the damper control. This cannot meet the limitations of these claims.

The examiner's statement that official notice is taken that each of these elements are known ignores the fact that those elements were not provided with their own controls in the past in a manner required by these claims. For these additional reasons, the rejection of these claims should be withdrawn.

*The Rejection of Claims 24, 26, 28 and 29 Over 35 USC §103 as Being Unpatentable Over Kobayashi, et al. and Further Taken With Official Notice is Improper.*

These claims further define what is meant by the "outdoor HVAC unit." They make clear that the outdoor HVAC unit which has its own control is either an air conditioner or a heater pump. It is certainly not Appellant's claim that it has invented either the air conditioner or heat pump. Rather, the invention is to incorporate a control on such a unit and communicate with the central control over the data bus.

The examiner has only Kobayashi, et al. which shows the damper control. This cannot meet the limitations of these claims.

The examiner's statement that official notice is taken that each of these elements are known ignores the fact that those elements were not provided with their own controls in the past in a manner required by these claims. For these additional reasons, the rejection of these claims should be withdrawn.

*The Rejection of Claims 4, 10-11, 16-17 and 19-21 as Being Unpatentable Over Kobayashi, et al. is Contested.*

The examiner admits Kobayashi, et al. does not disclose the required four wires communicating between a central control, an indoor unit and an outdoor unit. With no support, he simply argues that using the same four wires to connect all of the elements would have been obvious. He ignores the fact that the patent also does not disclose an outdoor unit having its own control communicating with the central control as is required by the claim. There is no reason to include a data bus into the Kobayashi, et al. system. Thus, all of these claims are improperly

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rejected for these additional reasons, in addition to the reasons mentioned above with regard to claim 1, et al.

*Claim 11 is Separately Improperly Rejected.*

Claim 11 requires that there be at least one peripheral unit hard-wired to the indoor unit control. The indoor HVAC unit control is designed to include control information for said at least one peripheral unit.

The examiner does not even treat this limitation in the rejection. This feature provides an ability to have intelligent control for a system that is not provided with its own control.

*Claim 16 is Separately Improperly Rejected.*

Claim 16 requires that the outdoor HVAC unit control communicates with the central control serially through the indoor HVAC unit control. Kobayashi, et al. does not provide any such structure or control features.

*The Rejection of Claims 3 and 12 Over Kobayashi, et al. and Otsuka, et al. is Improper.*

Otsuka, et al. is relied upon to show peripheral HVAC units and in particular a humidifier. It is not appellant's claim it has invented a humidifier. Otsuka, et al. does not disclose a humidifier connected to a central control in the manner required by these claims. Simply, these claims are allowable over the prior art.

*The Rejection of Claims 6 and 18 is Improper.*

These claims are rejected over Kobayashi, et al. and further in view of Munson, et al. It is the examiner's contention that Munson, et al. teaches an interface adapter. However, Munson, et al. does not teach an interface adapter that provides a control to communicate with a connected unit of an HVAC system. Moreover, there is no motivation to incorporate any such system into Kobayashi, et al. Kobayashi, et al. has hard-wired controls extending to each of its components, and there simply would be no proper suggestion for the proposed modification.

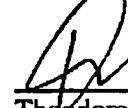


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**CLOSING**

For the reasons set forth above, the rejection of all claims is improper and should be reversed. Such action is solicited.

Respectfully submitted,

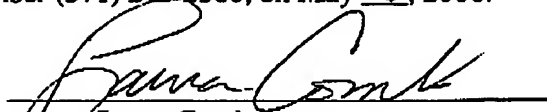


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Dated: May , 2006

**CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8**

I hereby certify that this correspondence is being facsimile transmitted to the United States patent and Trademark Office, fax number (571) 273-8300, on May 18, 2006.

  
Laura Combs

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**CLAIMS APPENDIX**

1. An HVAC system comprising:  
a thermostat incorporating a central control, and operator input switches;  
a data bus communicating control signals from said central control to an indoor HVAC unit, said indoor HVAC unit being operable to provide a heating function to air within an environment, said indoor HVAC unit being provided with a control that directly controls said indoor HVAC unit, and which receives control signals on said data bus from said central control.
2. The HVAC system as set forth in claim 1, wherein an outdoor HVAC unit is provided with its own control, and said outdoor HVAC unit control communicating with said central control over said data bus.
3. The HVAC system as set forth in claim 1, wherein at least one peripheral HVAC unit includes its own control, and communicates through said indoor HVAC unit control to provide control signals to and from said central control.
4. The HVAC system as set forth in claim 1, wherein four wires communicate said indoor HVAC unit control to said central control, with two of said wires carrying power, and two of said wires carrying said control signals with a plurality of distinct signals being sent over said two wires carrying control signals.
5. The HVAC system as set forth in claim 1, wherein at least one peripheral unit is hard-wired to said indoor HVAC unit control, and said indoor HVAC unit control being designed to include control information for said at least one peripheral unit.
6. The HVAC system as set forth in claim 1, wherein an interface module is provided with a control to communicate with said data bus from an associated HVAC unit that does not have a control capable of receiving control signals over said data bus, said interface

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module being hard-wired to said associated HVAC unit, and said interface module being provided with control information for controlling said associated HVAC unit.

7. The HVAC system as set forth in claim 1, wherein a remote sensor generally communicates with said central control over said data bus.

8. The HVAC system as set forth in claim 1, wherein said central control and said indoor HVAC unit control are both microprocessors.

9. The HVAC system as set forth in claim 1, wherein said control signals include an identifier for routing information for said data bus.

10. An HVAC system comprising:  
a data bus including four wires communicating signals from a central control to a control for an indoor HVAC unit, said data bus including two control wires carrying a plurality of distinct control signals and two power wires carrying power, said indoor HVAC unit providing a power source for providing power over said two power wires, said central control being a system control for generating and sending controls signals to said indoor HVAC unit control, said indoor HVAC unit being operable to provide heating and a fan function to move air within an environment; and

an outdoor HVAC unit provided with four wires, with two power wires carrying power signals, and two control wires carrying a plurality of distinct control signals from said outdoor HVAC unit to said central control, said central control providing control signals to said outdoor HVAC unit control to operate said outdoor HVAC unit.

11. The HVAC system as set forth in claim 10, wherein at least one peripheral unit is hard-wired to said indoor unit control, said indoor HVAC unit control being designed to include control information for said at least one peripheral unit.

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12. The HVAC system as set forth in claim 11, wherein said at least one peripheral unit is a humidifier.

13. The HVAC system as set forth in claim 10, wherein at least one peripheral unit incorporating a control controlling its functions, said at least one peripheral unit control communicating with said central control over four wires, with two power wires and two control wires carrying controls signals from said central control to said at least one peripheral unit control.

14. The HVAC system as set forth in claim 13, wherein said at least one peripheral unit is a damper control module.

15. The HVAC system as set forth in claim 13, wherein said at least one peripheral unit is a sensor for sensing a condition in a room, said sensor providing signals to said central control over said two control wires.

16. The HVAC system as set forth in claim 10, wherein said outdoor HVAC unit control communicates with said central control serially through said indoor HVAC unit control.

17. The HVAC system as set forth in claim 10, wherein said outdoor HVAC unit control and said indoor HVAC unit control separately connect into said data bus to communicate to said central control.

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18. The HVAC system as set forth in claim 10, wherein an interface module is provided with a control to communicate with said data bus from an associated HVAC unit that does not have a control capable of receiving control signals over said data bus, said interface module being hard-wired to said associated HVAC unit, and said interface module being provided with control information for controlling said associated HVAC unit.

19. The HVAC system as set forth in claim 10, wherein said central control, said indoor HVAC unit control and said outdoor HVAC unit control are all microprocessors.

20. The HVAC system as set forth in claim 10, wherein said control signals include an identifier for routing information for said data bus.

21. The HVAC system as set forth in claim 10, wherein said four wires are provided by four distinct and separate wires.

22. An HVAC system comprising:  
a central control;  
a thermostat having operator input switches;  
an indoor HVAC unit being operable to provide a heating function to air within an environment, said indoor HVAC unit being provided with a control that directly controls said HVAC unit; and

a data bus communicating control signals from said central control to and from said thermostat and at least to said indoor HVAC unit, said indoor HVAC unit receiving control signals on said data bus from said central control and signals from said operator input switch being passed to said central control to generate control for said indoor HVAC unit over said data bus.

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23. The HVAC system as set forth in claim 1, wherein said indoor HVAC unit is one of a furnace and a fan/heater unit.

24. The HVAC system as set forth in claim 2, wherein said outdoor HVAC unit is one of an air conditioner and a heat pump.

25. The HVAC system as set forth in claim 10, wherein said indoor HVAC unit is one of a furnace and a fan/heater unit.

26. The HVAC system as set forth in claim 10, wherein said outdoor HVAC unit is one of an air conditioner and a heat pump.

27. The HVAC system as set forth in claim 22, wherein said indoor HVAC unit is one of a furnace and a fan/heater unit.

28. The HVAC system as set forth in claim 22, wherein an outdoor HVAC unit is provided with its own control and said outdoor HVAC unit control communicating with said central control over said data bus.

29. The HVAC system as set forth in claim 28, wherein said outdoor HVAC unit is one of an air conditioner and a heat pump.

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**EVIDENCE APPENDIX**

None.

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**RELATED PROCEEDINGS APPENDIX**

None.